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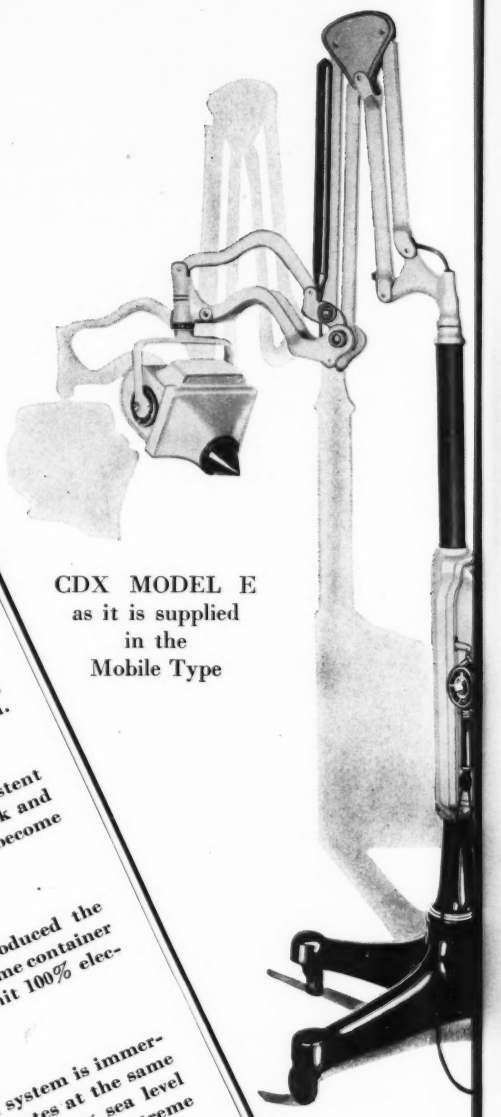

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The DENTAL DIGEST

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SPACE MAINTAINERS

BENJAMIN M. LANCET, D.D.S.
New York

THE dental profession for many years has said and published a great deal concerning the value and importance of having the normal sequence in the progressive stages during the transitional period of a child's dental mechanism, in which the temporary teeth are lost and the permanent corresponding successors erupt. Normally, there are deviations from any hard and fixed rule to which Nature might adhere. What may be normal for one person may not be normal for another. I think of the term normal as being a curve of variation within certain physiologic limits. While the degree of exactness, in this matter of loss and eruption of the deciduous and permanent teeth respectively, is a relative one, there are many cases that are so extreme in this regard that immediate intervention is warranted. Unless proper attention is directed toward these dentitions, unlimited harm might result.

For the sake of example, a child 6 years of age will be considered. A child of this age usually still has her deciduous molars and cuspids. The deciduous centrals and lateral incisors may or may not be present. Roentgenograms will invariably show the presence of the developing tooth germs underneath the various deciduous teeth. These permanent teeth develop at different times and at varying rates. While the permanent centrals and lateral incisors may erupt between the ages of 6 and 8 years of the child's life, the deciduous molars and cuspids are gradually undergoing resorption. This resorption is the function of these deciduous roots when pressure is brought to bear on them by the developing permanent teeth beneath these roots. Usually, the deciduous molars are lost between the *ninth* and *eleventh* years. The deciduous cuspids usually loosen and fall out only to be followed by their respective successors, somewhere between the *ninth* and *thirteenth* years.

When the temporary tooth is lost in a natural manner, there is usually a lapse of time intervening before the permanent successor erupts, which may vary from its immediate presence to a period of three or four months. Now for some consideration as to what the normal and physiologic manner is regarding the loss of deciduous teeth. The buds or germs which are laid down in the jaws beneath the apexes of the roots of the deciduous teeth gradually take on the deposition of lime salts and begin to develop and differentiate. Each one of these germs gradually assumes size and shape. Each one of these in time to come erupts into the mouth and is known as a permanent tooth. Each one of these developing permanent tooth germs as it grows and develops requires more room. It is this necessity for ample space in which to develop that calls for the function of the roots of the deciduous teeth; namely, to resorb under pressure as it is manifest by the underlying, developing permanent tooth. In due time the root or roots of the temporary tooth are almost completely gone. In a majority of cases, so much of the deciduous tooth is resorbed that the child can lift the crown of that tooth and tilt it, just before it is to be shed. In these cases, the permanent tooth is usually noticed to have already pierced the superficial gum tissue.

Prolonged Retention of Deciduous Teeth

In the case of those children whose primary dentitions are slow in shedding a series of roentgenograms should first be taken. The dentist must then study these roentgenograms to see first of all whether each deciduous tooth has a developing permanent tooth beneath it. If the permanent teeth are present, the next thing to observe is the amount of root resorption of the roots of the deciduous teeth, and also the degree of development of the permanent teeth. Finally, it is important to consider the age of the patient before any decision is made concerning the life of the deciduous tooth in the mouth of that patient. If the child has reached the limitation of that period in life which is considered to be the natural time for the loss of a particular deciduous tooth, if the same deciduous tooth is almost intact, and if the permanent tooth below it appears to be ready for eruption—then it is proper to extract the temporary tooth in question. This removal of the primary tooth will then allow the permanent successor to erupt into its normal position, all other things being normal. If, on the other hand, the roots at this time are advanced in their process of resorption, then it is advisable to stand by for a few months and let Nature take her due course.

Four or five years ago, while conducting some scientific research, I happened to examine a school girl who was 16½ years of age. She had three lower deciduous molars. There were two on the right side and the second deciduous molar on the left side. At my suggestion, roentgenograms were taken immediately. When these were examined, the presence of the three respective permanent successors were detected. The patient was told that it was urgent to have these three deciduous teeth extracted at once; however, the parents of this girl were rather reluctant. Finally they agreed to have the lower right deciduous tooth removed and see what would happen. Three months later another roentgenogram was taken of the lower right side for the purpose of comparing the relationship of the

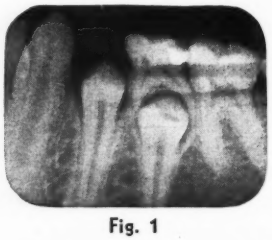


Fig. 1

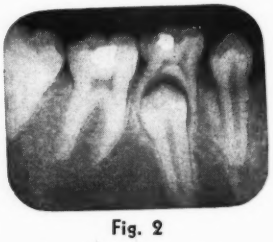


Fig. 2

Fig. 1—Roentgenogram of lower right side taken to compare relationship of the permanent first and second bicuspids (unerupted).

Fig. 2—Deciduous roots intact. Permanent teeth completely calcified within the jawbone.

permanent first and second bicuspids. Fig. 1 shows what was observed. The first bicuspid is seen rapidly making its belated eruption into the mouth to assume its normal position in the dental arch of the lower jaw. It will be noted how the roots of the deciduous second molar are practically intact. In Fig. 2 one can also see this condition present. These two roentgenograms show another important factor for consideration; namely, that the permanent teeth are almost completely calcified even though they are still enclosed within the jawbone.

There was no reason for the aforementioned situation to exist. This girl had visited her dentist regularly. There were excellent restorations in her mouth. No cavities were present. The dentist should have detected this condition at the time that the *tenth* or *eleventh* year was reached. It is up to the dentist to assume responsibilities, along these lines, of the growing dental mechanism. The particular case cited does not happen often; but the fact of the matter remains that when the patient comes for dental care religiously, as in this particular case, a prolonged retention of one or more deciduous teeth represents gross negligence on the part of the dentist.

Premature Loss of Deciduous Teeth

Premature loss of deciduous teeth is a matter of serious consequences unless proper provision is made to compensate for this condition, irrespective of the cause. If a deciduous tooth or teeth must be removed for one reason or another before its natural time, a space maintainer will maintain this space as Nature had planned for the unerupted permanent successors which are to follow. Unless space maintainers are provided in these events, the teeth on each side of these open areas will have a tendency to drift toward one another. This drifting means that that particular dental arch in question is diminishing in size as a whole. These teeth adjacent to the space move over by tipping or inclination, and not bodily. Together with this movement there is almost always a pronounced tendency to rotate simultaneously. Spaces are soon noted between other teeth, following on the heels of those which are proximating these premature spaces. How about the permanent tooth which was intended for that space? This may become impacted permanently or at best erupt outside of the normal line of occlusion.

The resultant picture of the condition described is an abnormally diminished dental arch. According to Nature's preconceived plan, the dental arches were to be of such relative proportions that the upper arch would overlap the lower during centric or normal occlusion. Nature also tries to compensate for any defects that might arise in the carrying out of the original plan. The only recourse for Nature in coping with this situation is to bring about a proportionate reduction in the size of the opposing dental arch, as may be called for in the case under consideration. This reduction in size of the dental arch, which has a full complement of teeth, is arrived at in any one of a number of ways. Assuming that the space or spaces existed in the lower jaw, let us see what the progressive steps ensuing might be as a result. This lower arch first of all becomes smaller owing to the drifting of the teeth. The shape of this arch automatically and simultaneously is altered, so that the result is abnormal in this respect also. As a rule, the lower anterior teeth move lingually so that when the jaws are at rest these anterior teeth strike against the palate instead of the lingual surfaces of the upper anterior teeth. The upper arch in the process of adapting itself to the size of the lower arch, as best as is conceivably possible under the existing conditions, usually does so in one of three ways:

1. The permanent cuspids usually are the last of the permanent teeth to erupt into the mouth. These may be shut out of the normal line of occlusion by a tendency on the part of the upper anterior teeth to move back until they might strike against the lower anterior teeth. This grave movement occurs during the time intervening between the loss of the temporary cuspids and the eruption of the permanent cuspids. In this instance, the permanent cuspids may be impacted permanently because of the movement of the lateral teeth toward the first bicuspids. In many cases the permanent cuspids under such conditions erupt high up in the gums and are seen to project like tusks, buccally, with the tip of the cusp, in an almost horizontal position.

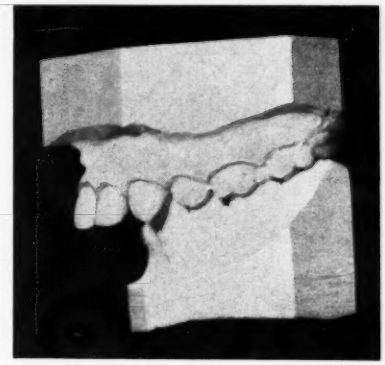


Fig. 3—Side view of dentition of a girl, aged 11 years.

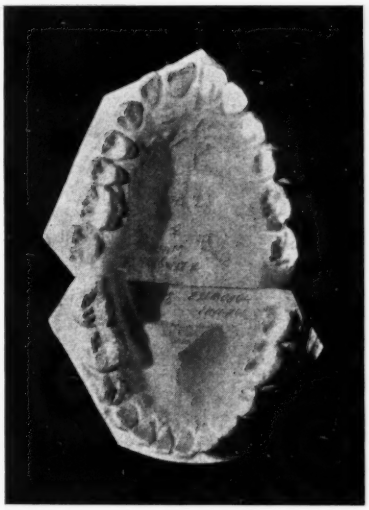


Fig. 4—Occlusal view in same case as shown in Fig. 3.

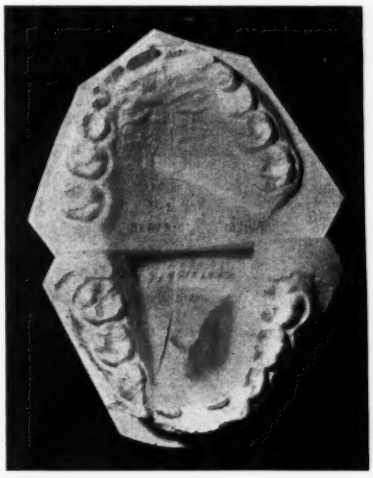


Fig. 5

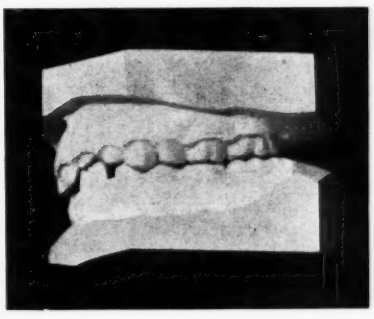


Fig. 6

Figs. 5 and 6—Premature loss of lower deciduous lateral incisors tends to result in malocclusion.

Together with this distal and lingual movement of the upper anterior teeth can be seen the anterior and lingual drifting of the upper posterior teeth. The upper line of occlusion is reduced to the extent of the combined widths of the two permanent cuspids and in many cases retains itself in this form as a compensating medium. Only orthodontia can then be resorted to; that is, if a normal arrangement of the dental mechanism is to be realized.

2. The upper arch may become narrow with the upper anterior teeth being forced out labially. In this type of readjustment, the posterior teeth of both jaws come in contact with one another; but the lower anterior teeth again strike against the palate during centric occlusion. Because the upper jaw is narrowed, the lower jaw is forced back to assume a relation with the upper jaw that is distal to normal. The upper protruding anterior teeth become weak and useless because of their lack of occlusion with the lower anterior teeth. This condition affects the pride of the patient and retards his social development. Mastication, articulation, and respiration are likewise interfered with as a result.

3. The mode of adaptation may be along the lines of crowded areas throughout the upper dental arch. Traumatic occlusion will be prevalent to a marked degree. Serious consequences might come to pass in such a condition without orthodontic intervention.

Fig. 3 shows the side view of the dentition of a girl, aged 11 years. This patient had her upper left second deciduous molar and both her lower deciduous second molars removed prematurely. Fig. 4 shows the occlusal view of the same case. No provision was made to maintain these spaces caused by the loss of the temporary teeth. At the time these photographs were made, these spaces had closed completely, and the second bicuspids had become impacted. The lower jaw is seen distal to normal. One will note the extreme protrusion of the upper anterior teeth. The lower anterior teeth strike the palate during centric occlusion. The patient at the present time is under my care. This article is not concerned with the orthodontic work involved in these dentitions and for that reason only the original condition is shown.

Figs. 5 and 6 show how the premature loss of the lower deciduous lateral incisors tends to result in a state of malocclusion. The two lower permanent central incisors are already hitting against the palate, and the child is only 7 years and 8 months of age. These cases invariably become progressively worse unless orthodontia gains a foothold. The distal relation of the lower jaw to the upper is easily observed.

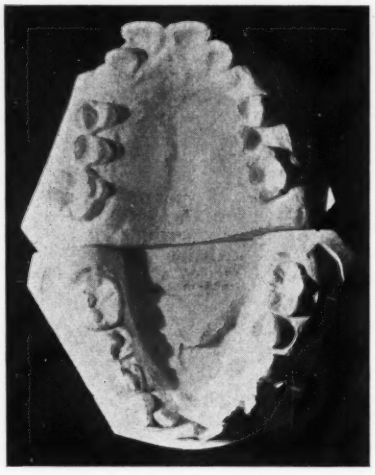


Fig. 7—Crowded teeth in boy, aged 14.

Fig. 7 depicts the mouth of a boy, aged 14 years, with a crowded lower set of teeth. The upper dental arch also is irregular. The upper permanent cuspids were lying directly over their respective adjacent permanent lateral teeth. This pressure on the labial side of these lateral incisors forced them somewhat lingual to the centrals. By placing some pressure upon the upper lateral teeth, in a labial direction, these cuspids were brought out. More than half of each cuspid was directly in front of each of its neighboring permanent lateral incisors at the time of eruption of the former. Fig. 8 shows the appearance of this case before and after treatment.

Figs. 9 and 10 illustrate how the dental apparatus collapsed in the mouth of a girl, aged 14 years. This extreme condition was brought about by the loss of her lower first permanent molars. Again, as noted in the other cases, the lower arch is seen to be moved back to a distal to normal position in its relation to the upper dental arch. Here also one can plainly see how the lower anterior teeth strike against the palate when the jaws are together; and too, the marked protrusion of the upper anterior teeth. These two illustrations show the appearance of the dentition before orthodontia was begun, and what the improvement was after treatment for one year.

In Fig. 11 is shown the case of a young girl whose permanent laterals in the upper jaw were congenitally missing. The permanent cuspids had completely moved over to the centrals on both sides of the upper jaw. This drifting of the cuspids diminished the line of occlusion of the upper dental arch to the extent of the combined widths of the two missing permanent upper lateral incisors. This reduction in size of the upper dental arch here too created a slight crowding of the lower anterior teeth accompanied by a distal movement of the lower dental jaw. Then also the same prevalent tendency that usually results in these distoclusion types; namely, the lower anterior teeth hitting the palate in centric occlusion was found to be present.

If properly constructed space maintainers had only been inserted in these mouths at the correct time, great harm might have been spared these children. Despite all that is being done to arouse a keener interest on the part of the dental profession, in this particular respect, one witnesses the existence of these types altogether too often.

Figs. 12, 13, and 14 illustrate the proper type of space maintainer to be made in those mouths in which spaces

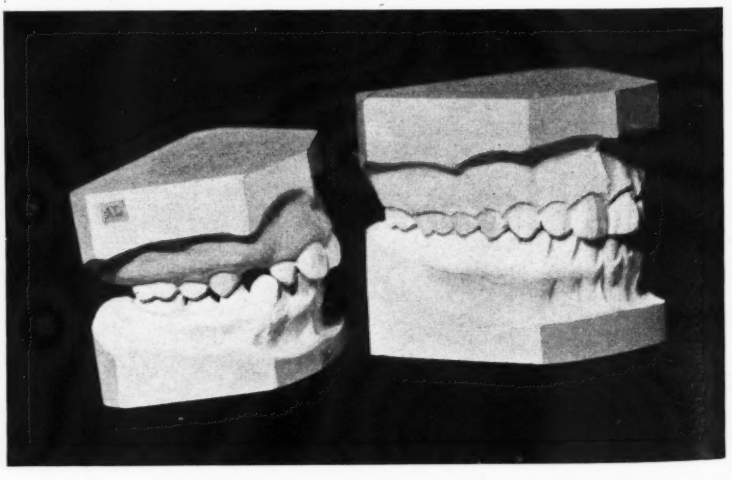
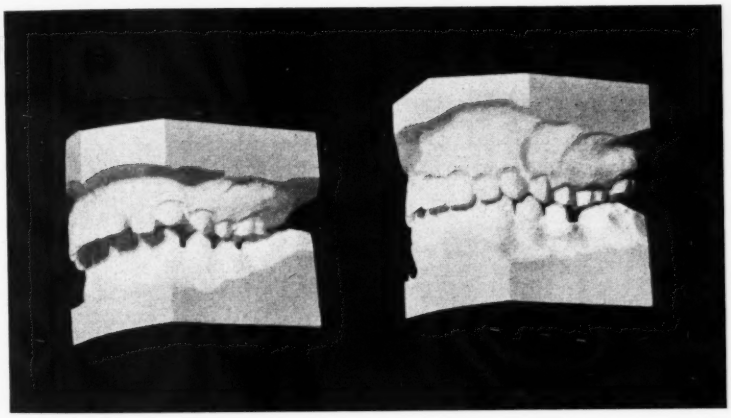


Fig. 8—Appearance in same case shown in Fig. 7 before and after treatment.

Fig. 9



Figs. 9 and 10—This extreme condition was brought about by the loss of the lower first permanent molars in a girl, aged 14. Before treatment, left.

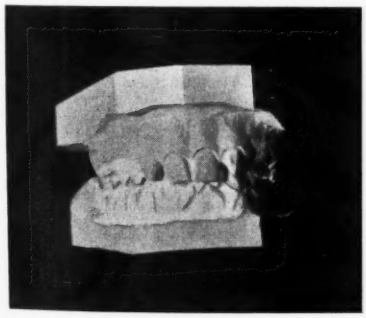


Fig. 11—Permanent laterals in upper jaw congenitally missing, and permanent cuspids moved over to centrals.

exist prior to the eruption of a permanent successor when the corresponding deciduous tooth had been lost prematurely or when the permanent successor is congenitally missing. This type of space maintainer I have found works harmoniously with the normal physiologic functions of the dental mechanism during the transitional stages of the shedding of the primary teeth and the eruption of the permanent teeth. This particular space maintainer is attached to a band around one of the teeth adjoining the space to be maintained and is held in position by a hinge-like arrangement.

Construction of Space Maintainer

1. A model is obtained from a good compound impression. This model is dry heated thoroughly until it is hard. This refers, of course, to plaster models. I prefer this material to stone because a more distinct reproduction of the denture is easily obtained; also because it is more easily affected by the carving knife which is used in this process.

2. The anatomic outline of the tooth in the gingival area is carved as near as possible. The band, if made correctly, will fit well about the neck of the tooth to be banded, and into the free margin of the gum tissue at the area of the gingival trough.

3. A little 18 karat solder is fused (fusing point 1450° F.) on the central portion of the proximal surface of the band adjoining the space that is to be maintained.

4. A precious metal round tube (7/32 inches long) is placed into a pin vise and cut into quarters. This platinum gold tube should fit a 19

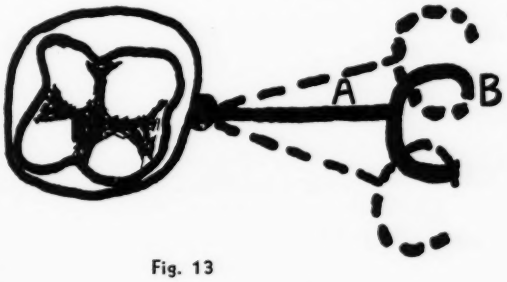


Fig. 13

Figs. 12, 13, and 14—Proper type of space maintainer when deciduous teeth are prematurely lost or permanent teeth are congenitally missing.

Fig. 12

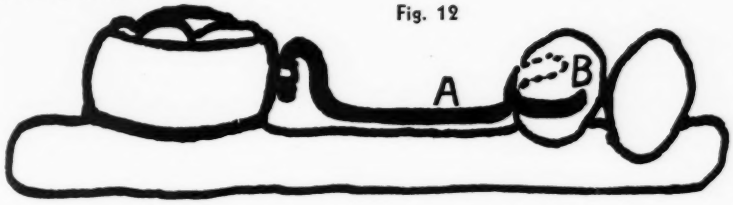


Fig. 14

gauge round wire. The ends of one of these four portions are rounded smoothly. This is best done by use of a pin vise and a fine file.

5. This small round tube is held in a pair of soldering pliers and in a vertical position soldered to the side of the band. The lower end of the tube should be about 2 or 3 mm. above the gingival end of the band.

6. In a Grunberg blowpipe flame, the end of a piece of 19 gauge gold-platinum wire is heated into a ball.

7. The free end of this wire is slipped through the tube from the gingival end toward the occlusal until the balled end of the wire touches the tube at its lower extremity.

8. With a pair of wire-bending pliers this 19 gauge wire is bent down toward the alveolar gum tissue until it just reaches the top of this tissue. This wire is extended across the space to be maintained so that the wire will just overlie the tissue as close as possible without impinging upon it.

9. A clasp is made with a piece of 0.032 inch gold-platinum wire that will take in three sides of the tooth proximating the opposite end of this space under consideration.

100 West Forty-Second Street.

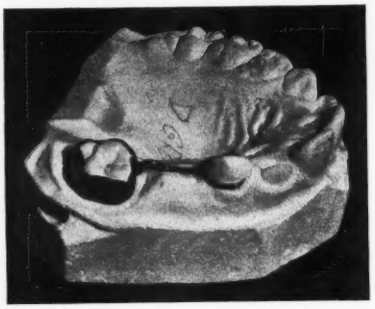


Fig. 15—Physiologic space maintainer.

10. The clasp is set in position on the one tooth and the band with the hinged extension wire on the other tooth. This extension wire is nipped where it touches the clasp wire (B) in Fig. 12. Some sticky wax is placed at the point of junction of the clasp and the extension wire.

11. The whole arrangement is carefully removed in one piece. This is invested and the joint soldered with 18 karat gold solder.

This type of space maintainer allows for a bucco-lingual movement which is necessary in the growing jaw. I have found that the jaws increase in width rather than in length during the transitional periods of growth and differentiation. Additional length of the lower jaw, what little there is, takes place in the region of the rami. These conclusions have been arrived at by two scientists, Franke and Brash. In Fig. 15 is illustrated one of these physiologic space maintainers which was made for a practical case in my practice.

These maintainers do not interfere with but rather help normal occlusion; they maintain spaces that were intended for permanent teeth that are yet to erupt. The space maintainer should be allowed to remain in position until the permanent tooth has pierced the gum tissue.

ADDITIONAL WEIGHT FOR A COMPLETED LOWER DENTURE

I. S. Jacobson, D.D.S., of Mt. Olive, Illinois makes the following suggestion:

Ordinarily, in cases in which a weighted denture is required there will be a thick layer of vulcanite between the surface resting on the ridge and the diatoric tooth. It is then easy to cut a deep cavity into the buccal and lingual flanges with an inverted cone bur. The undercut must be exaggerated. The cavity is then extended past the undercut with a round bur to a point as close to the center of the ridge as possible. Cavities should be cut about 10 mm. apart, thus the danger of weakening the denture is minimized. One or two small lead pellets are placed into the extended portion of each cavity. One should not allow the pellets to rest in front of the undercut. A good silver amalgam is packed in and polished after it has thoroughly set.

The concluding two installments of WHY DENTAL CARIES WITH MODERN CIVILIZATIONS? by Weston A. Price, D.D.S., M.S., F.A.C.D., will appear in June and July. Because of lack of space we have been obliged to delay the tenth installment, FIELD STUDIES AMONG MODERNIZED AND PRIMITIVE ESKIMOS OF ALASKA, which was to have appeared in the present issue.

ETHYL CHLORIDE ANESTHESIA FOR CHILDREN

SCOTT MORRISON, D.D.S.
San Francisco

FEW dental practitioners realize the value of ethyl chloride as an anesthetic, both local and general, in the extraction of deciduous teeth. It is either because a dentist feels that he does not have enough child patients to warrant its use, or because he feels that there are other anesthetics that are just as good and more universally used that he refrains from giving it a fair test. It is also generally believed that ethyl chloride is more or less in the dangerous class of anesthetics. Fatalities have been known to result from its use. But it is a known fact that these few fatalities have resulted only in the case of adults when the patients were carried into a deep stage and when a cardiac ailment was primarily the cause of death. The present day method of administering the anesthetic to children has been 100 per cent efficient.

At the Forsyth Dental Infirmary in Boston, administration of ethyl chloride inhalation began in 1915. Since that time more than 150,000 cases have been handled in children from the ages of 3 to 15 without one case terminating in an undesirable result. The work in this department is done in accordance with surgical principles and is under the direction of Doctor Roland E. Weller. Each interne at the Infirmary is required personally to carry through approximately 150 cases of ethyl chloride inhalation anesthesia. The majority of internes as recent graduates from various dental colleges over the country have not had any previous training in the use of ethyl chloride. Most of them have used only procaine hydrochloride and nitrous oxide-oxygen which are the drugs universally used. The ease and simplicity of administration, the excellent results obtained, and the absence of after-effects have resulted in the complete use of ethyl chloride in extraction of deciduous teeth in preference to all other anesthetics by these internes in private practice following their term of service at the Infirmary.

It is often difficult to reason with children when they come to the office primarily to have a tooth or some teeth extracted. Frequently it is the child's first visit to the dentist. In every case it is the dentist's duty to create in the mind of the child a favorable impression of dentistry. The first impression is a lasting one. There is no need of a complicated apparatus or syringe to horrify the child beyond possible means of treating him with ease. This fact, coupled with ease of use and perfect safety, makes ethyl chloride a valuable asset to our practice of dentistry.

Physiologic Action

Careful investigations show that ethyl chloride is a direct depressant to the heart muscle, but not as powerful as chloroform in this respect; chloroform is believed to be nineteen times more powerful. It also causes a fall of blood pressure as a result of the relaxation of the blood vessel walls. The respiratory center is depressed because of the fall of blood pressure and consequent lowering of the blood supply to that center. When used for anesthetic purposes, these effects are all moderate and only become important if cardiovascular disease is present.

Administration

There are various methods of administration, but the one considered here is that used at the Forsyth Infirmary. The patient is carried only into a period of analgesia. Loss of certain functions while others are relatively intact is more characteristic of this agent than of other inhalation anesthetics. Pain sense is often lost before consciousness, and brief operations may be performed painlessly at this stage.

It is necessary when given by inhalation, because of its great volatility, that the ethyl chloride should reach the patient in a fairly concentrated form. It is for this reason that ethyl chloride is unsuitable for prolonged operations. Its extreme volatility makes its effects short-lived. The period of analgesia obtained allows the operator a sufficient length of time in which to enable him to extract all necessary teeth and roots, or to perform any such minor surgery as he may desire.

Procedure

The first step in the inhalation procedure is to seat the patient in a chair that is slightly tilted backward. The knees should be strapped to the chair to prevent forward slipping. The hands are placed in a clasped position on the patient's lap. A rubber mouth prop is then inserted into the mouth on the side opposite the area to be operated on and the patient is instructed to bite down on it.

Induction of the ethyl chloride is started with the placing of a two-thickness piece of gauze, about 4 by 4 inches over the mouth and over the bridge of the patient's nose. The position of the operator is behind the patient. The thumb and index finger of the left hand is placed over the gauze in such a manner as to pinch the nostrils closed gently, permitting inhalation through the mouth only. The remaining fingers of the left hand are placed under the chin and assist in holding the gauze tightly over the area. In this manner a secure hold is obtained on the patient's head and jaw, and a clear unobstructed view of the eyes is possible. It is best to permit the patient to breathe pure air for a moment. The ethyl chloride tube is then held several inches away from the gauze and an intermittent spray is applied. A "frost" should not be allowed to form as this clogs the meshes of the gauze. The tube of ethyl chloride is constructed in such a manner that the spray may be accurately directed to any point.

After inhalation of the anesthetic for about thirty seconds, certain signs and symptoms appear that guide the operator as to the proper operating stage. The patient may answer a question intelligently by a nod of the head although at the same time pulling a few strands of hair will cause no signs indicating pain. Extraction of a simple deciduous tooth may be performed at this stage. If the anesthetic is continued further, the lid reflex becomes sluggish and the eyes sometimes begin to roll and soon become fixed either upward or downward. The arm if lifted is relaxed, and occasionally the patient snores slightly. The conjunctival reflex is present and the pupillary reflex is present. At this stage the operator may proceed with the work of removing two or more deciduous teeth, or retained deciduous roots. The period of narcosis at this stage is from about one and a half to two minutes.

If the patient should reach an excitement period during administration, the ethyl chloride must continue to be administered until a deeper stage is reached which terminates the period of excitement.

When the gauze mask is removed, the patient rapidly recovers consciousness owing to the extreme volatility of the drug, and usually experiences no unpleasant symptoms, although vomiting may occur in some cases.

Until recently, the procedure at the Infirmary was to apply a drop of oil of orange to the gauze mask prior to inhalation of the ethyl chloride. The procedure at present is to administer the straight ethyl chloride as the oil of orange was believed to have a nauseating effect on the patient.

It is not advisable to attempt a second administration of ethyl chloride at the same sitting.

Complications

Ethyl chloride is contraindicated if there is any obstruction of air passages. Serious valvular disease of the heart or myocardial degeneration also contraindicate its use. If cyanosis develops during its use, the drug must be withdrawn at once. It is noteworthy that alarming symptoms when they occur develop with great rapidity. In the use of the technique described here for children, however, complications rarely occur and if they do occur they are of minor consequence.

If cyanosis occurs it is due to an obstruction of the respiratory tract, caused usually by the presence of mucus, blood, vomitus, or falling back of the tongue. Tilting the child's head forward usually relieves the obstruction in the larynx if it is due to mucus, blood, or vomitus. If the tongue has fallen back, it may be grasped with a piece of gauze or a pair of tongue forceps and pulled forward, which relieves the cyanosis at once.

Cessation of breathing may occasionally occur because of insufficient air being mixed with the ethyl chloride. It may cause a spasm of the muscles of the larynx. If this occurs the ethyl chloride should be removed, and pressure under the diaphragm will result in reflex inspiration. Pure air relieves the spasm.

Syncope may be noticed when it occurs by the extreme pallor of the patient and dilated pupils. It is caused by a sudden cerebral anemia. The ethyl chloride should be removed and the head lowered. Inhalation of aromatic spirits of ammonia is enough to return the patient to consciousness, although the recovery is slow.

Shock is identified by pallor, fast feeble pulse, and a shallow respiration. There is a slow return to consciousness. The child should be kept warm. If respiration should stop, an injection of a stimulant, such as atropine sulphate or strychnine sulphate, should be made. Artificial respiration is resorted to and, if necessary, inflation of the lungs with oxygen should be done.

Fig. 1—Child seated in the chair prior to the introduction of the rubber mouth prop, which is placed opposite to the area to be operated upon. The chair is tilted backward slightly and the patient's knees are held firmly against the seat to prevent forward slipping.

When the anesthetic is administered to the child in such a light quantity a complication is a rare occurrence. Good judgment, knowledge of physiologic action and symptoms, and careful use determine the success of its administration.

Ethyl chloride has a distinct advantage over other anesthetics in the case of an unruly, struggling, crying child. The technique here is simple. Two cotton rolls may be saturated with the drug and placed between the two layers of gauze. This is then placed over the nose and mouth. With each cry and consequent deep inhalation, absorption of the drug is fast. The crying stops almost immediately and the operation may then be performed at once, unhampered by any struggling on the part of the child. The patient recovers from the effects of the drug usually no longer crying and extremely grateful for having the tooth removed so painlessly.

Local Application of Ethyl Chloride

Ethyl chloride also has its use as a means of producing local analgesia when it is sprayed upon the part; by its rapid evaporation it freezes the nerve endings to the point of insensibility.

Fig. 2—The application of a two-layer thickness of thin mesh gauze to be used as a mask, with proper finger and arm positions shown. Ethyl chloride is administered at this point.

The method employed at the Forsyth Infirmary is to saturate a cotton roll with ethyl chloride and then place this over the area to be operated on for a period of from ten to fifteen seconds. The effect here on the child is largely a psychologic one, because the child is firm in his belief that it "won't hurt while the gum is frozen."

Local application is indicated in an extremely loose deciduous tooth or a loose root fragment. Elevators should be used in these cases whenever feasible rather than forceps, for most children prefer a tooth to be pushed out rather than pulled.

Properties and History of Ethyl Chloride

It might be well here to go into a little of the history and properties of the drug. Ethyl chloride is a haloid derivative (monochlor-ethane $C_2H_5C_1$) prepared by treating absolute ethyl alcohol with dry hydrogen chloride.

135 Stockton Street.

It was obtained or discovered in the fifteenth century and was first used as an anesthetic by Flourens in 1847 and used the following year by Heyfelder. It was little used until 1895 when a pure preparation was introduced; since that time it has been extensively used as an inhalation anesthetic and as a freezing anesthetic for local anesthesia.

On account of its extreme volatility, ethyl chloride should be preserved in hermetically sealed glass tubes and kept in a cool place away from lights or fire. It is a colorless, mobile, volatile fluid having a characteristic and rather agreeable odor, and a burning taste. Ethyl chloride is soluble in water and readily soluble in alcohol. It boils at a temperature of 12.5°C. to 13° and at its ignition temperature burns with a smoky green-edged flame with production of gaseous hydrochloric acid. When liberated at ordinary room temperature from its sealed glass tube, ethyl chloride vaporizes at once. The gas is inflammable and consequently it should not be used in proximity to any gas flame or fire.

Extraction of permanent teeth under the influence of ethyl chloride anesthesia, although acceptable and successful when used by an operator skilled in this particular phase of administration, is not advised here for the general practitioner. Procaine hydrochloride or nitrous oxide-oxygen is indicated in such cases. Usually the child experiencing an extraction of a permanent tooth is of such an age that he may be reasoned with successfully. To compare ethyl chloride to procaine hydrochloride or nitrous oxide-oxygen would be asking too much of the anesthetic. It is best used in removal only of deciduous teeth and its success and results in this field are unsurpassed.

ABOUT OUR CONTRIBUTORS

Benjamin M. Lancet received his D.D.S. from the New York College of Dentistry in 1925. (Course in Orthodontia, University of Pennsylvania, 1925-1926.) Doctor Lancet is the author of numerous articles on orthodontia which have appeared in the dental periodical literature since 1927. He is past president of Pi Delta Sigma dental fraternity, was research associate under the auspices of the Evans Dental Institute at the University of Pennsylvania in 1926 and 1927, and has given dental health talks over the radio weekly for three years from Brooklyn radio stations. Doctor Lancet's practice is limited to orthodontia.

Scott Morrison received his D.D.S. in 1932 from the College of Physicians and Surgeons, San Francisco. Doctor Morrison is a member of the A. D. A., California State Dental Association, and Psi Omega. Since his interneship at the Forsyth Dental Infirmary, Boston (1932-1933), Doctor Morrison has been engaged in the general practice of dentistry.

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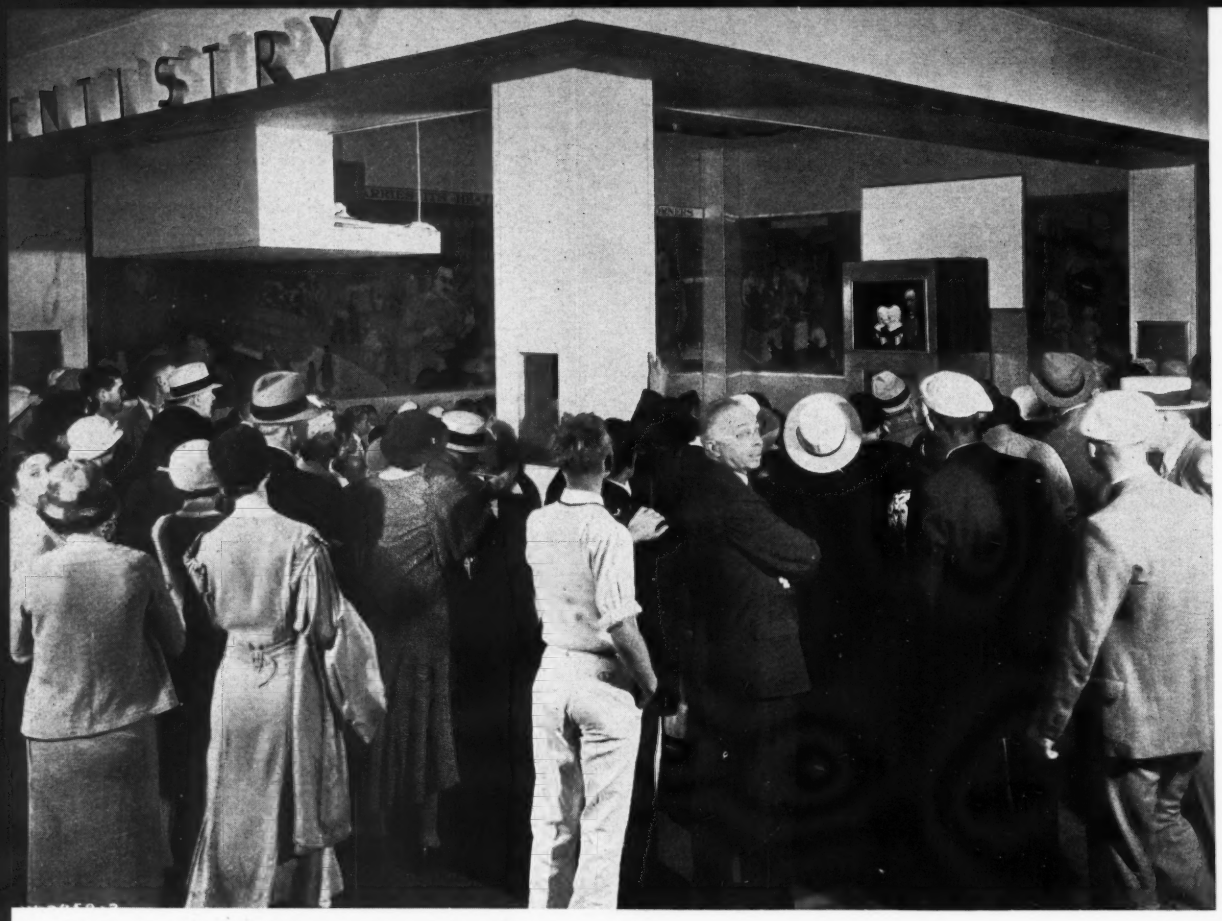
Elmer S. Best, D.D.S., attended the Royal College of Dental Surgeons, Toronto, and the Chicago College of Dental Surgery from which he was graduated in 1906. Since 1907 Doctor Best has been engaged in the general practice of dentistry in Minneapolis. He is a member of the A. D. A., and component societies and of the F. D. I. Doctor Best frequently appears on the programs of dental societies both as essayist and clinician throughout the United States and Canada, but he is especially known as the Editor of the *Dental Survey.*

Miriam Simons Leuck (Mrs. Gerald Leuck) received her Ph.B. in 1921 from the University of Chicago, and her M.A. in 1923 from Northwestern University. Mrs. Leuck was on the Research Staff of the Committee on the Study of Dental Practice of the American Dental Association (1931-1932). She is a member of the honorary journalistic society, Theta Sigma Phi. Mrs. Leuck is the author of books and articles on social problems: "Fields of Work for Women," D. Appleton Company, 1926; "A Study of Dental Clinics in the United States," and "A Further Study of Dental Clinics in the United States," University of Chicago Press, 1932; "Women in Odd and Unusual Fields of Work, *The Annals of the American Academy of Political and Social Science,* 1929, page 166; "The Changing American Home," *Current History,* February, 1931.

Sidney Sorrin, D.D.S., has on a previous occasion contributed to The Digest. His article Periodontal Disease: Diagnosis and Treatment appeared in two installments in the November and December, 1932, issues of The Dental Digest, and his professional biography appeared in the November number of that year.

The biographies of Lester Hollander, M.D., and B. A. Goldmann, M.D., appeared in the March, 1934, issue of The Dental Digest.



An Average Crowd

THE DENTAL EXHIBIT AT A CENTURY OF PROGRESS EXPOSITION: 1933 AND 1934

ARTHUR D. BLACK, A.M., M.D., D.D.S., Sc.D.

Chicago

GEORGE WASHINGTON'S artificial dentures, the Chalice of Antioch, and the Russian Crown jewels were perhaps the three most popular single exhibits at A Century of Progress Exposition. Almost continuous lines filed by these exhibits during ten hours of every day for 170 days. Publicity in magazines and press placed these items on the lists prepared by visitors from all parts of the world before they left home.

SPECIAL BRUSH INSTRUCTIONS BY THE DENTIST ARE OFTEN DESIRABLE
VIGOROUS BRUSHING OF THE GUMS HELPS TO PREVENT PYORRHEA
INNER SIDE OF UPPER BACK TEETH PLACE BRISTLES ON GUM AND ROTATE BRUSH DOWNWARD OVER GUMS AND TEETH
CHEWING SURFACES OF ALL THE TEETH SHOULD BE BRUSHED BACK AND FORTH WITH HEAVY PRESSURE

Toothbrushing Exhibit

Between four and five million people visited the dental exhibit, which had about 5000 square feet of floor space and almost 250 feet of aisle frontage. Many spent several hours, and large numbers returned again and again to bring friends and particularly children. And as eager and numerous an attendance is anticipated at the dental exhibit this year.

Dentistry's lessons were told in simple language, through the medium of attractive and diversified exhibits, in which action, color, good lighting effects, movie films, and sound were combined. The lessons were appealing to young and old, and were so interwoven and related that the progress of the profession and its service was well portrayed.

The development of the teeth from birth to twenty years was presented by an animated sound movie. As the visitor watched the development and eruption of the teeth on the screen of the little theatre, the voice told of the importance of proper nourishment during the nursing period and of the diet particularly during the formative period of the enamel. Dystrophies of the enamel caused by malnutrition and disease were pictured, as were the irregularities resulting from the loss of the first permanent molars.

In the same theatre, a tooth puppet show was given three times daily to crowds averaging about 250. The delighted audiences of both grown-ups and children listened to Jimmy Chew and Sally Grinder as they talked and danced and gave plenty of good advice on the care of the teeth and the importance of vigorous chewing.

A motor-driven toothbrushing exhibit was constantly surrounded by an interested crowd. Six aluminum heads, each with an accompanying arm and hand, gave continuous demonstrations of the brushing of the gums and teeth in various sections of the mouth. The hexagonal base, on which the figures were mounted made a complete revolution every three minutes.

A motor-driven mastication exhibit demonstrated the movements of the jaws of the meat-eating animals, the plant feeders, and man. Attention was called to the fact that man's mechanism qualified him to eat both meats and vegetables. The exhibit also included a set of full dentures, mounted on an articulator, which was synchronized with the movements of the jaw of the man—an example of the progress of the profession in scientific studies of the mechanism of mastication.

The Talking Tooth illustrated a story of dental caries and focal infection. Twelve hundred small electric lights, in shadow boxes behind a 4 by 8 foot ground glass screen, showed a beginning decay in a pit in the occlusal surface of a permanent molar which gradually involved enamel, dentine, and pulp, and was followed by the death of the pulp, the formation of an abscess in the bone, and the extraction of the tooth. The tooth told its own story of pain and suffering, and gave a fine lesson in the possibilities of prevention. Pyorrhea was similarly portrayed on another large glass screen.

One of the most attractive exhibits was the Century of Progress in Dental Practice. A motor-driven revolving platform presented four scenes in sequence: the practice of dentistry and the operating room of the dental hygienist one hundred years ago, fifty years ago, and today. The equipment and furnishings of each room were exact and complete for the period, including the costumes of patients, operators, and assistants. As an example of the care with which visitors studied these exhibits, it is recorded that the attention of a member of the staff was called to the fact that the little valve was open in one of the side wall gas brackets of the office in 1883. The error was promptly corrected.

One 21 foot alcove window contained three exhibits of plaster models, illustrating improvements in facial contours as a result of the placing of properly designed dentures, of orthodontic procedures, and of plastic operations by the oral surgeon. Another similar alcove called attention to exercise and diet in relation to health.

180 North Michigan Avenue.

A motor-driven toothbrushing exlong and 11 feet high, portrayed modern education. The building was shown in section and each room represented one course of study in the liberal arts and dental college curriculum. A model of the Baltimore College of Dental Surgery in 1840 stood alongside. A phonograph told the story of dentistry's progress from the time of Fauchard.

Bronze tablets commemorated the lives of many of dentistry's heroes who contributed to the forward movement of the profession. Morton and Wells were eulogized for their contribution to anesthesia. Gold fish were used to illustrate studies of local anesthetics.

A large illuminated x-ray box showed the normal and more common pathologic conditions of the mouth. Many show cases contained a large variety of exhibits, including moulages of syphilis and cancer of the mouth; historical exhibits of the development of the dental drill and of extracting instruments; good and bad types of toothbrushes; fossil jaws showing dental diseases; artificial teeth dating back two centuries, progress in crown and bridgework; cuneiform tablets from ancient Assyria describing diseases of the teeth and recommending the extraction of teeth to cure systemic disease.

The entire exhibit was electrically controlled and operated by the most elaborate phonographic set-up used by any exhibitor at A Century of Progress Exposition.

Top to Bottom

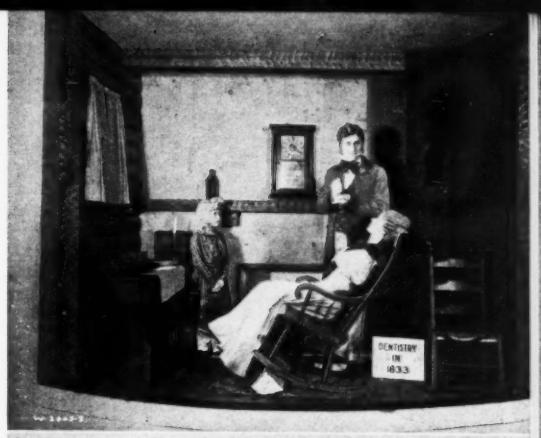
Dentistry in 1833

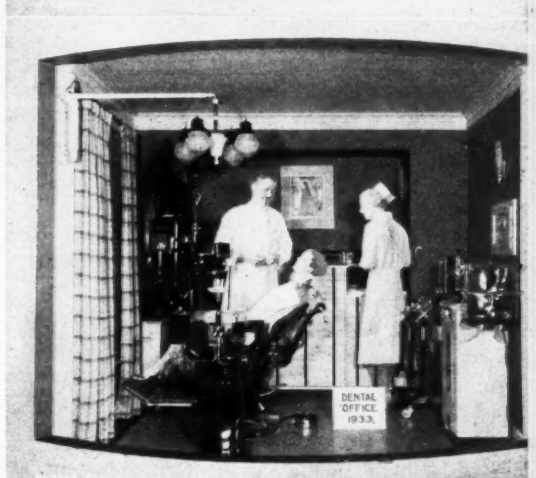
Dental Office 1883

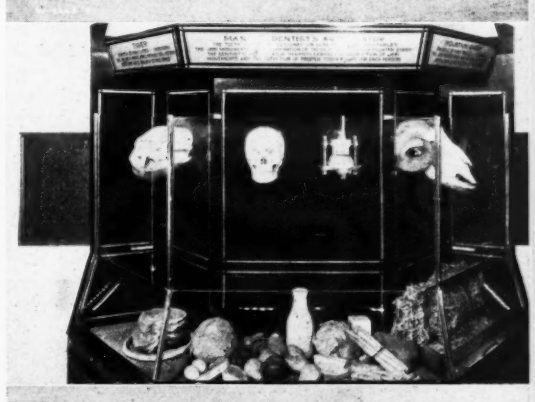
Dental Office 1933

Mastication

Talking Tooth







THE DENTAL EXHIBIT AT A CENTURY OF PROGRESS EXPOSITION OPENS MAY 26, 1934. DENTISTS SHOULD URGE PATIENTS TO ATTEND.

THE RADIO CHAIR

ELMER S. BEST, D.D.S.
Minneapolis

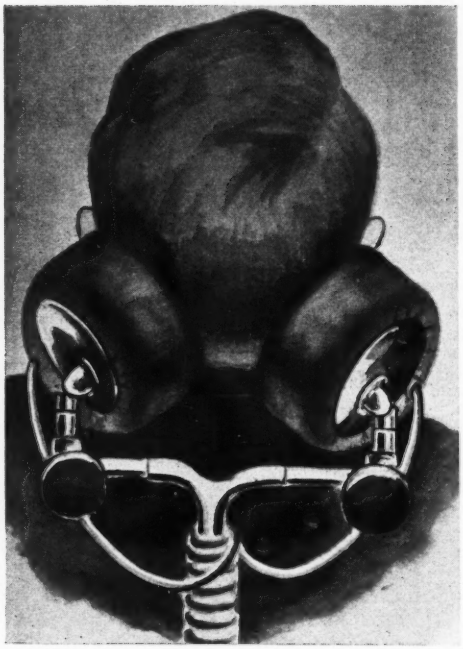
THE Radio Chair has been designed to make operative dentistry more comfortable for the patients who need it. The idea is by no means a "stunt" or an amusement device. It is a sincere attempt to bend scientific principles, the application of which to the science of dentistry might at first glance seem remote, to the genuine service of our profession.

The Radio Chair takes principal advantage of the bone conduction of sound. Radio amplifiers are built into the head rest of the dental chair so that they contact the mastoid portions of the temporal bones of the patient seated therein. Cables are carried to the amplifiers from a new combination sound-proof radiophonograph where an hour's program of self-changing records may be put on the machine. "Electrical transcriptions" for broadcasting are used.

The control of the volume of sound to come through the amplifiers is vested in a rheostat dial conveniently located on the left arm-rest of the chair. The patient turns this automatic volume control to suit his desire. The music should be audible only to him.

The basic idea of the radio chair is to convey pleasant sounds (music) to the hearing centers of the brain in sufficient volume to counteract the unpleasant sounds of grinding on the teeth with the dental engine. The grinding sounds engendered by the rapidly turning burs and stones are also conveyed to the hearing centers by bone conduction. Since bone-conducted sounds will overcome air-conducted sounds, it is essential that the music be carried to the hearing centers in the fashion outlined.

Provided that the music can be supplied in sufficient volume (an easy technical possibility), the pyschologic, as contrasted with the physiologic principles on which the radio chair works are readily comprehensible. In the first place, the cerebrospinal system, including the brain, can be occupied with only one thing at a time. In the second place, the human mind, when it must take its choice between stimuli, will prefer a pleasant experience (music) to an unpleasant experience (grinding). The radio chair provides a sufficient bone-conducted volume of soothing *music* to overcome the noise of *grinding*. As a result the average patient's attention to the noise of the grinding is completely dissipated.



Radio amplifiers built into the head rest of the dental chair.

The important corollary to this shift in attention is that the patient's delusion of *pain* during dental operations is also dispelled thereby. With local anesthesia, it is now fully possible to control pain that travels to the brain centers over afferent nerve pathways. But since the dental engine has come into universal use, the average patient has become psychologically conditioned to *feel pain* when actually he is only *hearing noise*.

With the noise of grinding eliminated by the radio chair, the sense of pain during dental operations largely vanishes. The patient remains relaxed and at ease in the chair. Even at the end of a long appointment he has not become a creature of jangling nerves and frayed temper. Obviously, this state of affairs offers many advantages to the operator.

To speculate on the social and economic benefits to patient and dentist that may arise from the general use of the radio chair is not within the province of this paper. It is sufficient to say that if it banishes the "fear attitude" which all too many patients hold toward even the simplest of dental operations, it will go a long way toward promoting the early and economical practice of genuine preventive dentistry.

801 Medical Arts Building.

DENTAL CLINICS IN AUSTRIA[1]

MIRIAM SIMONS LEUCK, Ph.B., M.A.
Evanston, Illinois

IN MEETING the questions of state medicine, sickness insurance, and clinic treatment today, American physicians and dentists are only encountering, in a somewhat changed form, problems with which their European colleagues have been contending for years. For that reason, European comments and observations may provide some sort of guide-post for American developments.

"Es ist ein Kampf"—"It is a fight," is the statement usually made by members both of the medical profession and of insurance groups early in any discussion of medical insurance in Austria. Unfortunately, many of the arguments advanced during such discussion partake of this warlike nature; they are flat statements and flat denials, with little proof to support them; and hence of little assistance to the investigator seeking the "whys" and "wherefores." True, proof regarding most of the disputed points is difficult to secure. The exact influence of social insurance in reducing average medical income cannot be estimated accurately, for changing currency values, the surplus of physicians following the World War, and the general economic difficulties in all countries during this period are factors that must be considered. Similarly complicated are the questions of costs of administration of insurance systems, effects on professional standards, quality of service rendered, and all the other points that enter into an evaluation of medical insurance. Statistics are not only frequently inexact and conflicting, but they are often unobtainable.

These difficulties only increase the value of such a work as Doctor Georg Weinlaender's "The Management of Dental Clinics in Vienna."[2] A modest appearing publication, of only thirty-nine pages, it provides more real ammunition than a dozen more pretentious but purely polemical works. Complimented on his booklet, Doctor Weinlaender replied rather wryly, "It was a great deal of work, and I have received nothing but abuse for it, but—there has never been any sort of real answer to it, and I am writing another, similar study for publication this fall."

The work is effectively simple. Doctor Weinlaender has taken the reports of the Arbeiterkrankenversicherungskasse of Vienna for the three years of 1928 through 1930 inclusive, and from their own statistics regarding the work of their division on dentistry, has derived his arguments and proofs. The result is frankly an attack on the method of rendering dental services through clinics, rather than in private practice, and the effectiveness of this attack lies in its appeal to the self-interest, not of the dentists, but of the patients themselves. Most medical attacks on insurance systems have been weak in their appeal to the general public, because they stressed the point of view of the medical profession, rather than the public. Doctor Weinlaender indicates, however, that the patients are the chief sufferers through the clinical methods adopted by the insuring group in question.

This Viennese insuring group employs two methods of caring for the dental needs of the workers insured through it. The first, and older method, is that of paying private dentists, either by salary or according to services rendered, to provide such care. The second method, which has grown rapidly in importance in recent years, is that of the dental clinic; i.e., a large central establishment, with dentists, technicians, and all workers employed on salary and working under the direct supervision of the Kasse. Doctor Weinlaender's booklet is of particular interest to American dentists in that it illuminates the contrast between dental services rendered under private direction, even though paid for by insurance methods, and similar services rendered in a central institution directly controlled by the insuring body. It has been impossible to obtain such information for clinic studies in America, because of the lack of any single institution operating under such parallel methods and providing the statistics therefor.

The heart of this comparison lies in the number of each of the various types of services rendered per hundred patients, by the clinics, and in the private care paid for by the Kasse. This comparison is indicated in the accompanying table.

The most striking feature of this comparison is the contrast between the number of restorations, and the similar contrast between the number of extractions, under the two methods of rendering service. Out of every hundred patients receiving treatment in the clinics, eighty-seven had teeth extracted, while only thirty-two per hundred had such extractions under private care. On the other hand, fewer than two out of three patients receiving clinic care were given even a single restoration, as compared with an average of more than five restorations per patient for those under private attention. Any comment on the probable relation between these figures is almost unnecessary; it would be hard to find an American patient who did not, however reluctantly, realize that restorations neglected this year mean extractions some year in the future.

Type of Service	*Number of such services rendered per* 100 *patients. in* 1930.	
	In Clinics.	Under Private Care.
Prosthetics	15	16
Prosthetics repairs	6	3
Restorations	63	519
Extractions	87	32
Miscellaneous	40	1

Doctor Weinlaender also offers some information on the important question of comparative costs. Every student of dental clinics in the United States knows that our information regarding such costs in our country is nearly useless, as too few clinics keep any sort of accurate records to provide a basis of comparison, and those which do keep records are frequently dependent on donated buildings or donated services to lower their costs. In Vienna, according to Doctor

(*Continued on page* 178)

[1] Leuck, M. S.: *A Study of Dental Clinics in the United States: 1930* and *A Further Study of Dental Clinics in the United States*, University of Chicago Press, Publications of the Committee on the Study of Dental Practice of the American Dental Association, numbers 3 and 4.

[2] *Zahnambulatoriumsbetriebe in Wien* by Medizinalrat Doctor George Weinlaender, published in 1932 by the Reichsverbandes oesterreichischer Zahnaerzte.

TRAUMATIC OCCLUSION: ITS DETECTION AND CORRECTION*

SIDNEY SORRIN, D. D. S.
NEW YORK

TRAUMATIC occlusion is a subject that is being discussed in all dental societies and colleges because of its important relationship to general dentistry. During the past few years, so many diseased dental conditions have been traced to traumatic occlusion as its source that more time and energy is being spent in studying the means of detecting its presence and how it may be corrected or prevented. All phases and specialties of dentistry are readily recognizing the value of occlusal coordination in relieving many diseases that heretofore had not responded to other forms of treatment. Doctor Joseph Pollia[1] has devoted several chapters in his book on the recognition of traumatic occlusion by means of the roentgenogram. Likewise Doctor Lee Doxtater[2] has stressed the importance of the coordination of occlusion. He states in part:

. . . traumatic occlusion is a very important and frequently occurring cause of the failure of bridge cases. . . . the proper time for the elimination of any traumatic occlusion which might be present in the mouth is before the beginning of actual construction of the bridge.

Traumatic occlusion is an excessive stress brought to bear on the crown of a tooth, or transmitted to a tooth from a bridge span, or similar prosthetic appliance. This stress acts directly on the pericementum, and it is the ensuing disturbance in this tissue which constitutes the initial step in the development of periodontal disease.

A phenomenon which should be mentioned at this point is that many teeth are to be seen which are in a relation indicating that they are receiving the excessive stress, yet these teeth may not, when first observed, exhibit definite symptoms of periodontal disease. The apparent anomaly is explainable on the basis of tissue resistance, which varies in different individuals and at different times in life. Observation by those especially interested in this phase of dental science has been to the effect that few people possess a sufficient resistance to withstand indefinitely a continued traumatic occlusion. The result is that, unless the traumatic occlusion is relieved, there will sooner or later occur a definite breaking down of the periodontal tissues.

One of the factors that seems to bring about a lowering of resistance in some mouths is the insertion of bridgework. Many cases have been observed in which the teeth exhibited no perceptible periodontal disease, in spite of the presence of traumatic occlusion, yet soon after the insertion of bridgework there has been a perceptible inauguration of disease. Most commonly the teeth affected are those which carry the bridge, or with which the bridge occludes. But quite often a similar, but possibly less severe breaking down is to be seen in other parts of the mouth.

Doctor Harold Keith Box[3] of Toronto has endeavored to differentiate between traumatic occlusion and traumatogenic occlusion when he says, A traumatic occlusion is a contact relation of the masticatory surfaces of the teeth which is directly the result of trauma. A traumatogenic occlusion as applied to natural dentures is an occlusion, which, under biting pressure, produces an injury in the periodontal tissues.

Until these terms become more generally accepted I shall use the term traumatic occlusion to indicate an abnormal occlusal stress that is capable of producing or has produced injury to the periodontal tissues.

Balanced occlusion as interpreted by prosthodontists cannot be applied to the natural teeth. This can best be exemplified in the protrusive relation. In artificial dentures, at least three points are in contact in protrusive position (three point contact), and in this position a balance is procured because uniform pressure is transmitted to the entire upper and lower ridges by means of the balance of stress on the dentures. These dentures are balanced in the sense that the distribution of force is evenly divided. In natural dentures this stress is felt solely on the teeth in contact, and balance (prosthodontia) is not procured except that the teeth in contact have an even distribution of stress; hence the name equilibrated stress in referring to the so-called balance of occlusion in natural dentures. The same idea is observed in all movements of the mandible. With this thought in mind, in considering the various movements of the mandible, the attainment of equilibrated stress rather than balanced occlusion will be considered.

It is important in studying the stresses in normal occlusion to realize that all teeth present in the mouth are provided with alveolar support sufficient to withstand the stresses that are normal for the teeth. When these normal physiologic stresses are present and are readily accommodated by the investing tissues a condition of physiologic occlusion is present. But when these stresses are excessive, an overloading or overstress takes place, and these can be classified as lateral or horizontal and vertical overstress depending on the direction of the excessive pressure. Vertical overstress may be caused by (1) high restorations; (2) drifting; (3) loss of teeth with stress on the remaining teeth, and (4) stress on the cingulum of the anterior teeth. Lateral or horizontal overstress includes (1) stress during the lateral movement against inclined planes; (2) stress on the anterior teeth during the lateral movement of the posterior teeth; (3) stress on the anterior teeth in eccentric protrusive relationship; (4) wedging on inclined planes during the direct closure of the jaws, and (5) clasps and attachments of faulty design which tend to induce overstress on abutment teeth.

The following are examples of traumatic occlusion.[4]

1. Malrelationship of upper and lower teeth to one another which allows food impactions to develop.

2. The patient complains of pain after the restoration has been placed in the tooth. It is taken for granted that cavities in close proximity to the pulp have been lined. The pain may be traced to occlusal trauma. A shiny surface will often appear on the surface of the metal, denoting a high spot. Relief of this area will result in the cessation of pain. The effect of restorations that are too high is felt in the pericementum and pain is the result.

3. Pulp stones and calcareous degenerations of the pulp have been traced to traumatic occlusion.

4. In denture work, after the denture has been worn for a short period, the patient may complain of pain in a particular area despite the fact that the undersurface of the denture is smooth and the ridge apparently normal. Instead of relieving the under-

*Many points in this article resulted from valuable suggestions made by Clyde H. Schuyler, D.D.S., Professor of Denture Prosthesis, New York University College of Dentistry, in discussions with him on the subject of traumatic occlusion.

1 Pollia, Joseph: Fundamental Principles of Alveolo-Dental Radiology, Brooklyn, New York, Dental Items of Interest Publishing Company, 1930, pages 342-360.

2 Doxtater, Lee: Procedures in Modern Crown and Bridgework, Brooklyn, New York, Dental Items of Interest Publishing Company, 1931, page 250.

3 Box, H. K.: Traumatic Occlusion and Traumagenic Occlusion, Oral Health, December, 1930. This term has since been changed to traumatogenic occlusion.

4 Sorrin, Sidney: Traumatic Occlusion, Dent. Item. Int. 12, June, 1931, number 7.

surface of the denture as has been the procedure in past years, one should make a thorough examination of the occlusion in the various excursions of the mandible, and note the excessive strain during certain of these movements. If the denture is balanced properly the pain will disappear.

5. Pain in the condyle region is often observed when patients grind their teeth during sleep. Often, after occlusal correction, the pain disappears. Children grind their teeth because of disorders, and often as a result of second dentition when the permanent teeth are being crowded. Sometimes dentigerous cysts will cause this disturbance. Adults grind their teeth as a result of faulty occlusion and nervous irritability. Pain in the condyle region has also been observed after the loss of molars, which closes up the bite.

6. Doctor Paul R. Stillman has reported two cases of facial pain as a result of faulty occlusion. After treatment all symptoms disappeared.

7. Dull, constant pain is often felt by patients in the anterior part of the mandible. This at times is the result of traumatic occlusion in centric and protrusive positions.

8. When patients chew only on one side of the mouth the dentist should find the reason for this. He will probably find that this habit is the result of caries, loss of teeth, or faulty occlusion on the opposite side. It has been my experience that in cases in which traumatic occlusion has been the factor, patients will unwittingly chew on both sides after correction.

9. When a great deal of dependence is placed on a particular tooth in the case of a patient wearing a partial denture, the patient often complains of severe pain in that area. It is evident that the tooth is carrying too much of the burden. The pressure should be distributed evenly on the denture and tooth to relieve the strain.

10. Erosions are often traceable to traumatic occlusion. The excessive strain may cause irritation to the periodontal tissues with subsequent acidity in the exudate of the gingival crevices which attacks the tooth structure.[5] The occlusion should be corrected; the patient instructed in gingival massage, and the erosion treated with formalin, or saturated solution of potassium carbonate in glycerin.

11. Interproximal caries has been traced to traumatic occlusion.[5]

12. An interesting and instructive case is observed when upper anterior teeth drift. Often, there is some occlusal force present which has caused this process to develop. Even when occlusion seems to be absent, it is possible that at some time these teeth had been in occlusion and an abnormal pressure had been exerted against them.

Another fact, which relates to the lower third molars, has also been observed. Frequently these teeth are unerupted and express much force against the distal surfaces of the second molars, causing a crowding of the lower teeth, with subsequent labioversion. These in turn traumatize the upper anterior teeth, and in time they are moved labially. The forward movement of teeth has been observed when posterior teeth have been worn by attrition and no attempt had been made to stabilize the occlusion. In these cases, it is advisable to place onlays on the upper and lower posterior teeth to prevent the forward advance of the mandible. The checking of this movement eliminates the force that would ordinarily be applied against the lingual surfaces of the upper anterior teeth.

13. Another condition has been reported. In orthodontic treatment, after retaining devices have been removed, the upper anterior teeth in some instances continue to move forward. Orthodontists have found that the frenum penetrates deeply and often influences the position of these teeth. The slitting of the frenum and careful suturing have checked further movement of anterior teeth after they have been regulated. Other observers have reported that wandering of teeth may be caused by a disturbed systemic condition and periodontitis itself. Often proliferative gingivitis has been a definite factor in causing teeth to move out of position. Separation of the anterior teeth has also been caused by habits, such as lip-biting.

14. Biting of the cheek can be corrected if the slopes of the buccal cusps of the lower molars are changed. This is accomplished by rounding the cusps from the buccal side inward with a stone.

15. Traumatic occlusion is an important etiologic factor in the production of periodontal disease.

Harold Keith Box[6] has recorded twenty diagnostic signs of periodontal disease, and in many instances these signs have been caused by traumatic occlusion. The signs most frequently found are (1) traumatic crescents; (2) congestion of the marginal gingivae; (3) recession of the marginal gingival line; (4) McCall's festoons;

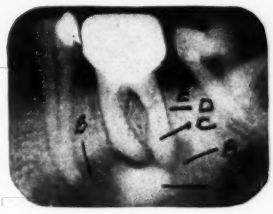


Fig. 1

Fig. 1—Although the areas explained in the picture are not all due to traumatogenic occlusion in this particular case, they are all found from time to time when teeth have suffered from traumatogenic occlusion. A, Bone condensation; B, rarefaction; C, hypercementosis; D, widening of pericemental space and thickening of lamina dura; E, loss of osseous structure due to food impaction.

Fig. 2

Fig. 2—Suggestive rarefied area at the apex due to stress in vertical direction.

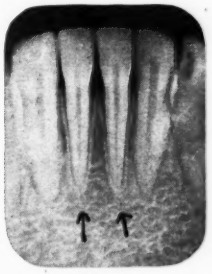


Fig. 3

Fig. 3—Arrows point to bone condensation formed from a habit neurosis. Patient would glide the incisal edges of the lowers across incisal edges of uppers when nervous and during sleep.

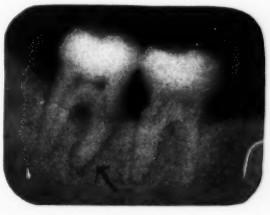


Fig. 4

Fig. 4—Stress on the molar observed roentgenographically by widening of pericemental space. Also note bifurcation involvement.

[5] McCall, J. O.: Studies in the Etiology of Approximal and Gingival Caries, J. Dent. Res. 6, 461, number 4.

[6] Box, H. K.: Studies in Periodontal Pathology, Toronto, Canadian Dental Research Foundation, 1927, pp. 115-120.

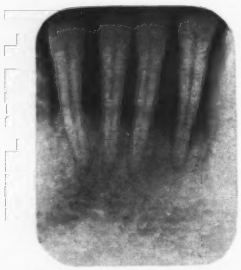


Fig. 5—Nonocclusion. Note evenness of bone absorption and lack of wear; the incisive surface indicates lack of function.

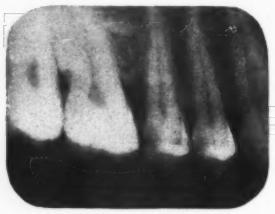


Fig. 6—Note cavities on bicuspids and also loss of bone between these teeth. The cavities resulted from food impactions caused by wedging action of lower plunger cusps. Note loss of bone.

Fig. 7—Loss of bone resulting from vertical and horizontal overstress.

(5) Stillman's clefts; (6) shortening of the crest of the septal gingivae; (7) absence of stippling; (8) increased depth of the gingival crevice; (9) epithelial nodules; (10) mobility of varying degrees; (11) various changes taking place in the alveolar bone; (12) gingivitis; (13) linear depression; (14) distended veins in the mucosa; and (15) pus in the crevicular exudate.

Signs of traumatic occlusion are often observed roentgenographically, and among the prominent lesions are the following: (1) widening of the pericemental space; (2) thickening of the lamina dura; (3) rarefaction; (4) condensation; (5) hypercementosis; (6) root absorption (Figs. 1 through 10).

The necessity of correct charting and diagnosis of the case is a vital factor in the treatment of disease and more time and energy should be devoted by the operator to this phase of treatment. Failure to cure a patient who has periodontal disease may occur at this stage, owing to inadequate investigation as to the exact nature of the disease prior to treatment. It is not the purpose of this paper to dwell at length on this important factor, but the success or failure depends on one's ability to acquaint himself thoroughly with this phase of the work. The purpose of this paper is to describe methods of detecting traumatic occlusion and how traumatic occlusion may be corrected. We must remember that traumatic occlusion is only one of many etiologic factors that are responsible for the development of periodontal disease.

The method that is being advocated to distribute pressure evenly on teeth requires much study and knowledge of occlusion and the factors that enter into its consideration. Health depends on function, and through normal function, structure is established. In the mouth health can be procured and maintained by a well-functioning dental apparatus. Study by means of models, roentgenograms, and charting of systemic and local observations are the means by which a scientific diagnosis and prognosis can be made. Photographs of the patient will assist materially in keeping a record of the progress of the case. The height of the cusps, their interdigitation, and deviations from the normal gingivae should be noted. In this regard, too, habits, such as lip-biting, smoking, and thread-biting, should be investigated.

Before grinding is actually begun, it must be decided which teeth should be extracted because of their advanced stage of disease and whether orthodontia, restorations, grinding, or combinations of these would be advisable. When the method is decided, one proceeds to grind in the occlusion.

When all preliminary study has been completed, one determines the means by which excessive pressure or premature contacts can be detected. Roentgenograms, palpation, ocular examination, study models, the patient's responses on closure of the mouth, together with articulating paper—all are excellent means of determining where overloading is taking place. One must not depend on one means, but check by all methods in order to be certain. The first step in the equilibration of occlusion is to investigate centric relationship.

Fig. 8—Excellent example of Nature's attempt to compensate. Note A and B taken in 1926. At the time there was severe overstress on the lingual cusps of the lower molar in centric and lateral excursions. Note Nature's attempt to build bone for support in order to resist the strain. No treatment was instituted and note the condensation breaking down into rarefaction shown in C and D taken seven years later, 1933. Also note bifurcation involvement. Nature cannot indefinitely resist the extra burden that the tooth is forced to endure. The tooth on examination was so loose that extraction was advised. After extraction the socket was examined carefully and found to be filled with necrotic bone. The tooth was vital all these years.

Centric Occlusion

1. The teeth should be examined thoroughly for the possible elimination of food impactions. Food impaction causes serious periodontal disturbance.

2. The centric occlusion should be checked to determine whether simultaneous contact of the opposing teeth is present. Even distribution of stresses is necessary.

3. Correction of centric should be accomplished with no closure of the maxillo-mandibular relation. It must be remembered that usually the lingual cusps of the upper posterior teeth and buccal cusps of the lower rest in the central fossae of the opposing teeth.

In considering natural dentures in centric relation, care must be taken to observe the proximal contacts of teeth to see whether they are properly lo-

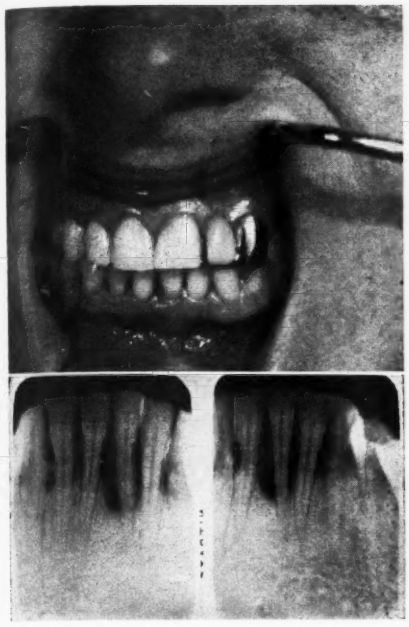


Fig. 9

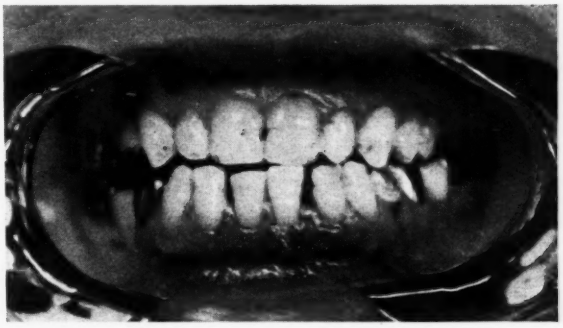


Fig. 10—The patient, a woman, aged 23, was a seamstress who used the upper left central incisor and lower left central for biting thread. Note result of trauma.

Fig. 9—The patient was a woman, aged 38. In centric position and in the protrusive position all strain falls on the lower left central. Note in the clinical photograph, the suppuration. Roentgenograms are so turned that they will correspond with photograph. Note rarefaction of bone.

cated; which teeth are absent and need replacement; whether the marginal ridges and grooves are properly constructed; whether there is contiguity of the teeth in the arch; whether there is uneven wear—these conditions must be carefully observed in order to prevent the development of food impactions (Hirshfeld[7]) plunger cusps, both on lingual and buccal surfaces, which might force food in between the teeth are often observed. By grinding, food impactions, which have developed as a result of malrelationships existing between the teeth in one jaw, or which may be due to abnormal relationships of the teeth of opposite jaws, can be eliminated. Other means of correcting abnormalities that have caused food impactions are (1) interlocking devices, (2) onlays, (3) orthodontia, (4) tooth extraction, (5) reconstruction of faulty restorations.

The next step in grinding in centric is to request the patient to close the jaw slowly to determine which tooth or teeth are in premature contact. Roentgenograms, palpation ocular examination, and study models are excellent aids in determining where overloading in the centric position is taking place. Study models are of assistance and should be mounted on an articulator in such manner that the articulator will correspond with the patient's movements. Often it is difficult to observe premature contacts in centric as patients have a tendency to glide over the offending teeth and give incorrect registrations. However, if the proper centric relationship between maxilla and mandible is obtained and transferred to the articulator, the teeth exhibiting traumatic occlusion can be observed. The tooth or teeth are noted and a comparison is made with the mouth. The patient can locate the tooth by closing slowly and lightly pointing out the tooth that feels higher. The patient should cease closing as soon as the slightest contact is made. One should never depend solely on the patient for information of this nature, but should check this knowledge with the methods previously mentioned. Patients may feel excess pressure in a certain area, yet point to the wrong tooth. With articulating paper acting as a guide, the portion of the teeth in premature contact will be marked.

The next step is the most important. It must be determined whether the sulcus will be deepened or the cusp in contact with it will be relieved. The following factors must be taken into consideration:

1. If the cusp of the lower tooth is in excessive stress in centric occlusion, but in harmony in the lateral excursions, it is logical to deepen the sulcus of the upper tooth. Should the cusp be relieved in this condition, the lateral relation might be disturbed.

2. If the cusp exhibits overloading in both centric and lateral excursions, it is advisable to grind the portion of the cusp of the lower tooth that is in abnormal stress. This does not mean that the tooth is disoccluded.

3. If there is premature contact in centric relation and no contact in lateral excursions (both working and balancing sides), the sulcus of the opposing tooth should be deepened. If the cusp of the lower tooth were to be ground, a wider separation between the teeth in the lateral excursion of the jaw would be created.

After these corrections, the pressure will feel equalized over the mouth and simultaneous stress will be observed. Once centric occlusion is established, grinding of the teeth in other excursions should be so accomplished that this relationship will not be disturbed.

Should the lower incisors exhibit no interference in various excursions of the mandible, and cause no strain on the upper teeth in centric relation, they should be allowed to remain in contact. It must be remembered that teeth that have been in contact, and then disoccluded, may again come into contact. (See exceptions under protrusive.) Teeth that are in traumatic occlusion are often disoccluded in order to give physiologic rest to the tissues. Should they come into contact later, the teeth will be better enabled to assume the normal stresses that they are expected to bear, because the periodontal tissues will have been rested. Often, too many teeth are brought out of occlusion unnecessarily thus complicating the procedure in grinding. When conditions as have been described in reference to anterior teeth are met, the eccentric movement from centric toward protrusive must also be considered. If the teeth are in traumatic occlusion in both the eccentric protrusive and centric, the following procedure should be instituted: (1) The planes of the upper teeth from centric to protrusive should be relieved so that there will be ease of movement with no tripping. (2) Disocclude by grinding the lower teeth to give physiologic rest. Should the lower teeth later come in contact there will be no interference in the eccentric protrusive.

(End of First Installment)

[7] Hirschfeld, Isador: Food Impaction, J. A. D. A. 17:1504 (August) 1930.

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SYPHILIS OF THE ORAL MUCOSA*

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and
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(Conclusion)

Coexistence of Tertiary Syphilis and Carcinoma

For some unexplained reason, tertiary syphilitic lesions of the mouth are frequently the site of the development of a carcinoma. This is especially true of the tongue. The prognosis of carcinoma is made materially worse when this situation exists.

In the clinical picture, syphilis usually predominates at first, but as the process progresses, the carcinoma makes itself more and more apparent. One or more carcinomatous tumors may arise and early regional adenopathy will follow. One must bear this in mind as often as the diagnosis of tertiary syphilis of the tongue is made.

Fry[9] stated that in 35 per cent of his cases of carcinoma of the tongue, syphilis was demonstrable.

Belote[10] studied the incidence of syphilis in cases of carcinoma of the tongue and found serologic evidence of it in 29.3 per cent of ninety-two cases.

Syphilis of the Salivary Glands

Syphilis of the salivary glands is exceedingly rare, but when it occurs it gives rise to a great deal of confusion. Gerber collected thirty-seven cases; of these the parotid gland was involved in twenty-eight, the sublingual in six, the submaxillary in seven, and the Blandin-Nuhn gland in one. The condition occurs usually in the tertiary stage, but it may accompany a chancre in the primary stage. In four of the cases it occurred in congenital syphilis.

Clinical Description—The appearance is that of a swelling or tumefaction of the glands, which is progressive. The skin overlying it shows a variable amount of erythema. On palpation, a somewhat hard, uneven, diffuse enlargement is elicited. Usually it is entirely devoid of tenderness. In those cases that occur in conjunction with a chancre the condition develops rapidly and evolutes in about fourteen days. In the tertiary stage, as has been noted, progression and evolution of the process is slow.

When it is unassociated with other symptoms of syphilis, it appears as a tumor of the parotid gland. On account of its size it may interfere with speech or mastication. Salivation may be present.

Bilateral involvement of the parotid glands has been noted in five instances by Neuman, and one instance by Osler. The histologic picture is that of a chronic infectious interstitial fibrosis.

Differential Diagnosis—Tuberculosis, lymphosarcoma, Hodgkin's disease, carcinoma, or occlusion of Steno's duct must be ruled out in the unilateral type, while the bilateral may resemble Mikulicz's disease.

Antisyphilitic treatment is exceedingly slow in its effect, and one must not rely on the therapeutic test as a method of differentiation. On account of the difficulties that this diagnosis presents, a biopsy is recommended which will, in most instances, be found to be of great help.

Fig. 40—Glossitis.

Treatment

The therapeutic objective consists of the destruction and complete eradication of the *Treponemata pallida,* the repair of the injury that this invasion has produced, and the production of as little injury to the patient as possible.

Mercury, bismuth, and the organic compounds of arsenic, the so-called arsphenamines, occupy the foreground as treponemicides, and the judicious use of these, alone or in combination, in conjunction with iodides and tonics, will eventually result in the accomplishment of a good result.

For purposes of treatment syphilis is divided into two types: acute and chronic.

1. *Acute Syphilis*—In this type the treatment should be most energetic. Principal reliance is placed on the

Fig. 41—A solitary gumma of the tongue. Note excavation of ulcer surrounding thickening of the tongue. This is a frequent precursor of carcinoma of the tongue. (Courtesy of Doctor Howard Fox of New York.)

*From the Pittsburgh Skin and Cancer Foundation.

9 Fey, H. J. B.: J. Hygiene, volume 29, 1930.

10 Belote, G. H.: J. A. M. A. 94: 1985, 1930.

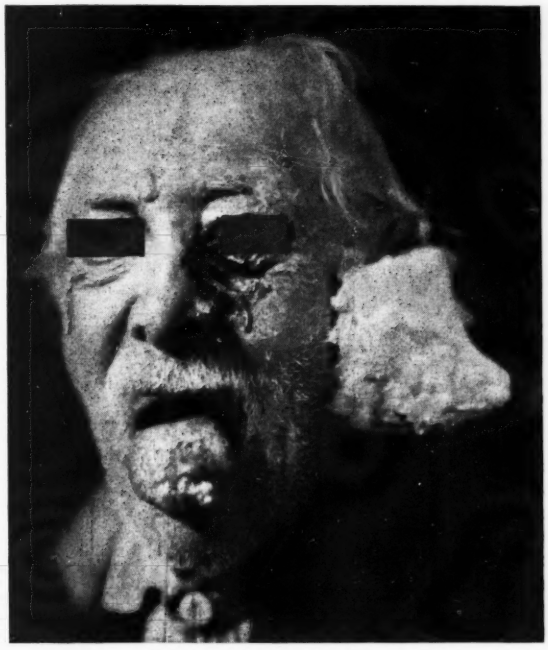

Fig. 42—Carcinoma of the tongue. An ulcerating mass with a pearly border. The tumor had the characteristic plaster of Paris hardness.

Fig. 43—Carcinoma of the tongue and lymph nodes. The cancer of the tongue in this case resembled a chancre, but its slow development and the involvement of the posterior cervical glands together with a biopsy clarified the diagnosis.

Fig. 44—Nodulo-ulcerative tertiary syphilis. Because it is rounded and has a clear center the lesion may be differentiated from a ringworm for which it had been mistaken. Note serrated edge, which is raised at certain points because of the nodules. The ulceration extends peripherally.

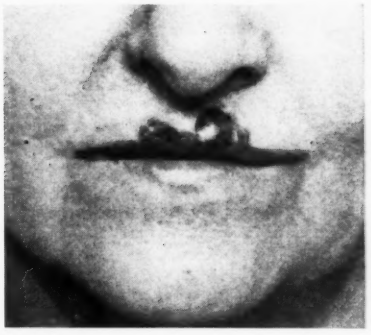

Fig. 45—Carcinoma of the upper lip resembling nodulo-ulcerative tertiary syphilis. Biopsy confirmed clinical impression.

Fig. 46—Carcinoma and syphilis of the buccal mucosa. Note configuration of the lesion. Carcinoma developed in a tertiary syphilitic lesion.

intravenous administration of arsphenamine, or salvarsan, or the so-called 606. This form of arsenical is used because we find it more stable, less toxic, and more efficacious when it is properly prepared, and administered unhurriedly. One dose of 0.3 to 0.5 Gm., dependent on the weight and tolerance of the patient, is given weekly. One intramuscular injection of one of the insoluble bismuth preparations in 1 or 2 grain doses is also administered weekly.

With a careful check on the well-being of the patient, on the toleration of the drugs, and on the clinical and serologic evidences of the disease, this treatment is continued uninterruptedly for three to four months, after which the frequency of the treatment is lessened. After one year of such a course, and if all the evidence, including the spinal fluid remains negative, the treatment is discontinued and the patient further observed for several years.

The main objective in the treatment of acute syphilis, which includes the primary and secondary stages, is the rapid destruction of the *Treponemata pallida*, and we believe

Fig. 47—Carcinoma and syphilis. The cancerous process developed in a gumma and spread rapidily.

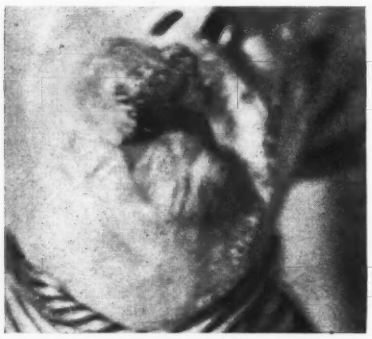

Fig. 48—Carcinoma and syphilis of the upper lip. Note crescentic border, tumefaction, and destruction. Prognosis exceedingly bad.

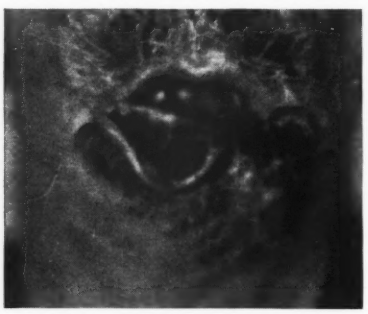

Fig. 49—Carcinoma and syphilis of the lower lip.

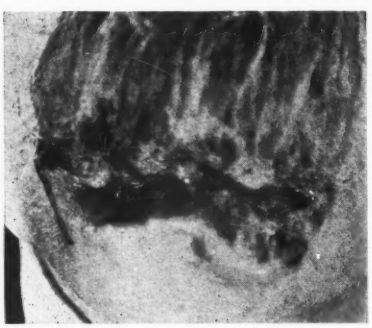

Fig. 50—Carcinoma and syphilis, a most destructive double process.

that the outlined treatment, except in the unusual patient, will be effective.

2. *Chronic Syphilis*—Chronic syphilis requires a less energetic and much more prolonged course of treatment. The objective of this is not only the destruction of the *Treponemata pallida* but also the lessening of the effects of the "scars" produced by syphilis in its lengthy sojourn in the patient. The cerebro-spinal and the cardio-vascular systems bear the brunt of chronic syphilis, so the treatment must be directed with full understanding and recognition of this fact.

Tonics, sedatives, fever-producing methods, cardiacs, nonexerting regime —these are added to the antispecific drugs mentioned for the treatment of acute syphilis. Injections of arsphenamine and bismuth are spaced further apart, so that the patient receives only one treatment a week. Careful attention is paid so that the heavy metals used do not produce an accumulative action, and the course of the treatment is continued from three to five years.

An important exception is to be noted in the treatment of a patient who shows manifestations of syphilis of the tongue. As pointed out, carcinoma develops frequently in such a lesion, and as the arsenicals seem to exert a strong influence on epithelialization, and as such an influence is not desirable in the presence of a precursor of carcinoma, reliance is placed on bismuth or mercury and the use of the arsenicals is discouraged.

Dental Prophylaxis as Part of the Treatment

Through the accumulation of heavy metals, or through hypersensitivity, or through the use of large doses of the drugs mentioned the gingiva of the patient may become unfavorably affected. The patient notices at first increased salivation, somewhat later a metallic taste, shortly after this the gums will become hyperemic, spongy, and will bleed on the slightest trauma. To this there will be added a dark bluish or black deposit along the alveolar free margin. Such a clinical picture, which is associated with pain and tenderness of the mouth, is known as a metallic stomatitis. Unless it is recognized early, unless the metals used are discontinued, and unless proper treatment is instituted promptly, this complication will lead to bone resorption and the loosening of the teeth and may lead to the loss of the latter. All this adds handicap through discomfort and debiliation of the patient, for it must always be remembered that we are dealing with a chronic disease, which alone is a heavy burden, throwing a great demand on the patient's physical make-up. Nothing further must interfere with his well-being or his ability to take food and retain a good bodily equilibrium.

The treatment of metallic stomatitis should begin with the treatment of the syphilis itself. The mouth should be put into as good hygienic condition as possible. Deposits of

Fig. 51—Gumma and carcinoma of the lower lip. This lesion was mistaken for an ordinary gumma but after a month's anti-syphilitic treatment the true nature was discovered. Note the subsequent illustrations.

Fig. 52—Carcinoma and syphilis of the tongue. Note tumor formation, ulceration, restriction of motility of the tongue, and the lack of oral cleanliness.

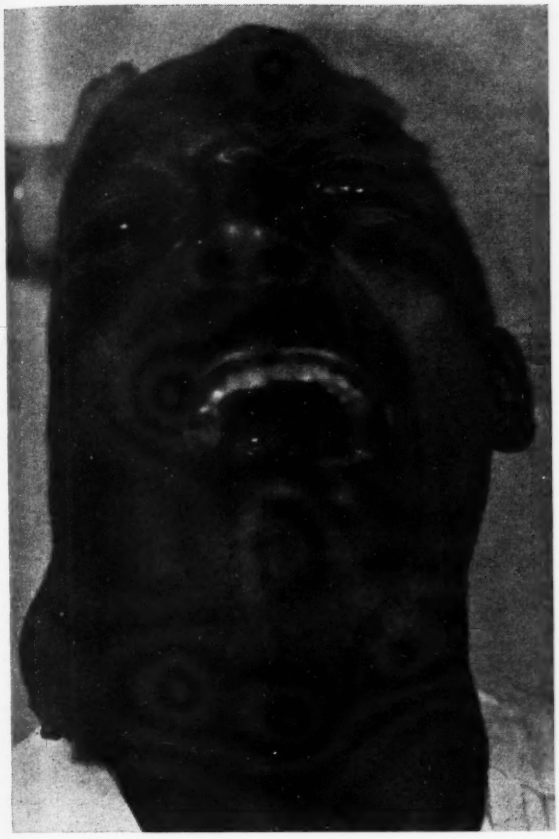

Fig. 53—Carcinoma and syphilis of the tongue. Note the cancer began in a gumma of the tongue which is bound down; practically immovable. The huge mass on the side of the neck is carcinoma of the lymph nodes.

Fig. 55—Chancre of the lower lip. Note the small size of the ulcerating area and the unusually large swelling of the lymphatic glands.

Fig. 56—Chancre of the lower lip. A very dangerous lesion as it is moist, sloppy, and swarms with the Treponema pallida.

Fig. 54A

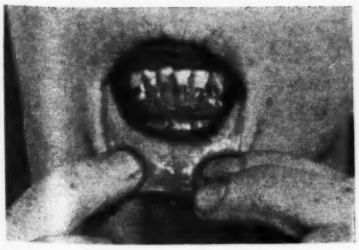

Fig. 54B

Fig. 54C

Fig. 54—A, B, C, Three stages of this condition, which is preventable by prophylactic treatment of the gums, before the administration of heavy metals. Note the spongy, hyperemic ulcerative gingivitis.

Fig. 57—Tuberculosis of the tongue. It is extremely difficult to differentiate it from a chancre or a carcinoma, but as there was no glandular enlargement a biopsy was taken which showed its tuberculous structure.

calculus, infections of all sorts should be eradicated, uneven, sharp, ragged teeth properly adjusted so as to eliminate any chronically recurring mechanical trauma, and frequent observance of the teeth by the dentist is essential.

Active treatment of a metallic stomatitis includes the local use of such mild antiseptics as sodium perborate, mercurochrome, and the use of sodium thiosulphate both as a mouth wash and by internal administration. This latter can be accom-

Fig. 58—Chancre of the tongue. Note the lesion resembles a button placed under the mucosa of the tongue; there is no ulceration present. The glandular enlargement is noticeable on the same side.

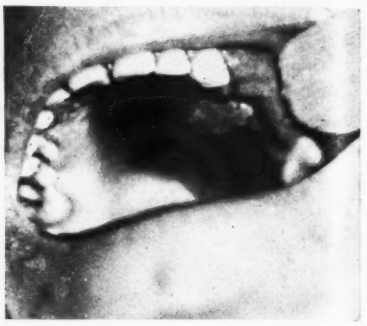

Fig. 59—This is an interesting and unusual case of chancre of the upper gums which is published through the courtesy of Doctor Casper M. Epstien* of Chicago who has kindly permitted us to use the history and the clinical photograph of this patient.

Mrs. I. H., aged 39, presented herself for examination on account of pain and swelling in the upper jaw. This was of five weeks' duration. Within a few days she developed the evidence of secondary syphilis. The lesion and her discomfort disappeared rapidly under antisyphilitic treatment. It is interesting to note that when the chancre first made its appearance this patient consulted a dentist who extracted an adjacent first bicuspid in order to relieve the swelling and pain. This, of course, only exaggerated the symptoms.

plished by the administration of sodium thiosulphate in 1 Gm. doses in an enteric-coated tablet or capsule, or it may be administered intravenously in 1 Gm. doses dissolved in 10 cc. of sterile water.

Conclusion

We have endeavored to outline the important factors in relation to syphilis, but even the most cursory reading will reveal how superficial this attempt has been. However, when one considers the vastness of the subject, one realizes that anything short of a treatise on this subject does not offer enough space to cover the important and the practical points. Nevertheless sufficient has been said to emphasize some of the difficulties one may encounter from the standpoint of diagnosis, treatment, and prognosis.

It has been pointed out that in the differential diagnosis a knowledge of acute and chronic inflammatory conditions, neoplastic diseases, specific and nonspecific granulomatous processes is essential. And further, that prognosis and efficacy of treatment go hand in hand with the early recognition of the disease.

We have also presented syphilis as an example or model for investigation of other diseases. Still there is an exceedingly important feature, from a practical standpoint, which needs elucidation.

When should the treatment of syphilis be stopped? At present one can only answer this according to his own clinical experience and according to the advice which he can obtain from other syphilographers. There are no methods of precision which may be accepted as a guide with absolute certainty.

We want to reiterate the importance of the dentist in the prophylaxis and treatment of metallic stomatitis, which may occur during the course of medication.

631 Jenkins Arcade Building.

*Doctor Epstein who is adjunct oral surgeon to Michael Reese Hospital, Chicago, has formerly contributed to the DENTAL DIGEST: Infections of the Mouth, 38:170 (May) 1932.

DENTAL CLINICS IN AUSTRIA

(*Continued from page* 169)

Weinlaender's summary, although the costs per patient are higher under private care than in the clinics, owing to the greater amount of services rendered such patients (restorations, etc.) the cost per individual service is lower in the private office, being about $.34 (2.7 Austrian schillings) as compared with an average clinic service cost of about $.40 (3.21 Austrian schillings). This extra cost in the clinic is, he feels, not due to any better service or increased payment of dentists, but to the higher administration costs involved in the elaborate clinic plant. As a matter of fact, the clinic costs should be estimated as even higher, because, in their status as quasi-public institutions, they do not pay the taxes paid by the individual dentist.

The question naturally arises as to the reason for the establishment of such clinics by the Kasse, if they actually cost the Kasse more money, while supplying a possibly inferior service to the patient. In Doctor Weinlaender's opinion, the clinics are established primarily as a fighting weapon against the independent dentist. Possessing such institutions, the Kasse can dictate regarding the payment of dentists, standards of dental service, split the dental profession into those whose livelihood is dependent on Kasse salaries and independent dentists, and consolidate its position as a complete intermediary between dentist and patient. The serious implications which such an intermediary position may hold for both professional standards and the well-being of the patients may be indicated in the policy regarding types of services employed by the Kasse clinics today.

Although only an isolated study of conditions in a far land, Doctor Weinlaender's booklet is significant for American dentists, presenting as it does, certain definite facts regarding a further stage in developments now taking place in their own professional life. The medical insurance system in Austria is nearly as old as the profession of dentistry itself. For many years the insuring groups have been a political and professional power. The development of clinics under their guidance is a post-war practice, rising, however, from powers and attitudes which have been long existent, and neither patient nor dentist can fail to profit by a study of the results disclosed in this unpretentious piece of research.

2326 Ridge Avenue.

The Editor's Page

MAY is a month of extremes: from international celebrations in the cause of anarchism to dedications to the child. In May "workers" throughout the world parade and sing the lusty wish for the dictatorship of the proletariat. In May parents and educators and health workers unite to discuss the child, his nature and his needs.

Before me as I write are three books: "The Conquest of Fear" and two books on child behavior. Perhaps some chance grouped them together or some subconscious mechanism is responsible. At any rate they found a way to this desk and seeing them here they demand attention. It is not impossible that herein may be some broad and fundamental principle that may be applied to dental practice.

Fear we all know; some of us more than others. Our fears may be with regard to tangible, physical things, fears of pain, of economic insecurity; they may be intangible dreads or indefinite anxieties: of impending doom, of loss of caste, of IT. Our work as dentists shows us fear in many cloaks. That of the child may be the fear of the unknown, of that which has not yet been experienced. The fear of the adult usually springs from the wells of memory. It is an association state. Something deep down in our natures suggests: "Once something similar to this happened. It was unpleasant. It may be repeated now." Before the bur begins its work, before the needle or the scalpel enters the tissue, the fear mechanism swings into motion. Then the inevitable happens: "fear tends always to produce the thing it is afraid of." We feel pain, perhaps, before pain receptors are stimulated. Such is the power of the association of memories. With such obsessions we are weighted. We can escape from many of them; we can lighten the load.

Because men in the biologic sciences have short patience with seers and cultists and of metaphysicians generally, we shall use the accepted medical terminology to describe the process of fear conquest. We may call it simply *mental hygiene*.

Now I turn to the two books on child behavior and I find that the child is born with only two fears. At birth he is afraid of loud noises and the loss of balance. Congenitally, we do not fear the darkness, snakes, fire, murderers, or the dental experience. Implanted upon us by suggestion or the association of ideas are our other fears. Parental discipline sometimes plants the seeds of fear. Thoughtless parental conversation ("My incision is 6 inches long" "The dentist used boiling oil, a harpoon, and a stick of dynamite to treat my teeth") in the presence of children may initiate fear. Cartoons and jokes in the public prints may be responsible.

Mark A. May[1] of Yale University says, "A child by original nature may fear responses to a loud noise. If he is shown a rabbit and a loud noise is made at the same time, by and by he will show the same fear response to the rabbit alone, even when there is no noise. To generalize this we may say that if a situation is associated with one that naturally arouses fear, the associated stimulus will in itself sooner or later become effective. Thus we see how many of our hates, aversions, or loves, and prejudices come about." Applying this principle to the dental experience, we should insist (1) that parents do not discuss their dental affairs with children; (2) that the child be kept out of the operating room when the parent is the patient and that the parent be kept out when the child is the patient; (3) that the dentist if he is obliged to hurt the child should attempt to counteract this undesirable reaction by some pleasant experience or incident; (4) that the child be brought to the dental office early enough in life before any condition has developed that may produce severe pain in its correction. An early visit by the child before anyone has implanted the dental-fear state is extremely important. Clinical experience has often demonstrated the tractability of the pre-school child who is free from apprehension of the dental experience.

In discussions of the dental affairs of the child too little has been said or written of the prevention and conquest of dental fear. When we examine the programs of pedodontia we see that our discussions have revolved around diet, amalgams, space maintainers, anesthesia, and *physical* factors. Those complex feeling situations which are the basis of the child's emotional life must be better understood in relation to the dental experience.

1 May, M. A.: "What Science Offers on Character Education" in BUILDING CHARACTER, The University of Chicago Press, Chicago, July, 1928, p. 43.

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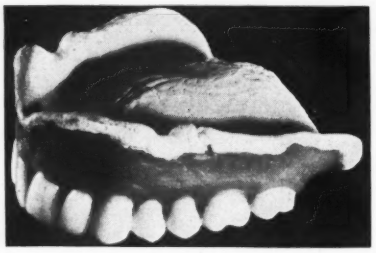

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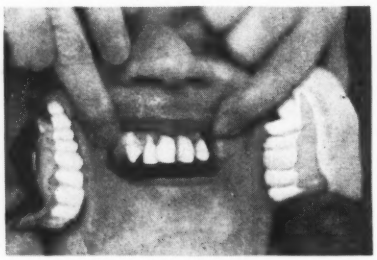

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